

**WHAT IS CLAIMED IS:**

1. A method for creating a message endpoint on a device in a distributed computing environment, the method comprising:

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receiving a request to create a message endpoint for a client on the device to communicate with a service within the distributed computing environment;

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obtaining a service advertisement for said service, wherein said service advertisement specifies a message schema, a service address and an indication of whether or not access to said service is restricted;

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if access to said service is restricted, obtaining an authentication credential to access said service;

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if access to said service is restricted and if said authentication credential is obtained, constructing said message endpoint, wherein said message endpoint is configured to send messages according to said message schema to said service address; and

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if access to said service is not restricted, constructing said message endpoint, wherein said message endpoint is configured to send messages according to said message schema to said service address.

2. The method as recited in claim 1, wherein said constructing is performed within a runtime environment of said device.

3. The method as recited in claim 1, wherein if access to said service is restricted and if said authentication credential is obtained, said constructing said message

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endpoint comprises configuring said message endpoint to include said authentication credential with each message sent to said service address.

4. The method as recited in claim 1, wherein if access to said service is  
5 restricted:

said service advertisements specifies an address for an authentication service; and

said obtaining an authentication credential comprises requesting an authentication  
10 credential from said authentication service, wherein said authentication  
credential indicates that said client is authorized to access said service.

5. The method as recited in claim 4, wherein said requesting an  
authentication credential from said authentication service comprises sending an  
15 authentication credential request message to said address for said authentication service  
specified in said service advertisement.

6. The method as recited in claim 1, wherein said message schema defines  
data representation language messages to be sent from said client to said service and from  
20 said service to said client.

7. A method for creating a message endpoint on a device in a distributed  
computing environment, the method comprising:

25 receiving a request to create a message endpoint for a client on the device to  
communicate with a service within the distributed computing  
environment;

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obtaining a service advertisement for said service, wherein said service advertisement specifies a message schema and a service address for sending messages according to said schema to access said service;

5 determining if messages sent from or received by said message endpoint for said client should be verified for compliance to said schema;

if said determining determines that messages should be verified, constructing said message endpoint to communicate messages with said service address, wherein said message endpoint is configured to verify messages communicated with said service according to said schema.

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8. The method as recited in claim 7, further comprising, if said determining determines that messages should not be verified, constructing said message endpoint to communicate messages with said service address, wherein said message endpoint is configured to communicate messages with said service without verifying said messages according to said schema.

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9. The method as recited in claim 8, further comprising, if said message endpoint is configured to communicate messages with said service without verifying said messages according to said schema, notifying said service that said message endpoint for the client is not performing message verification for messages sent to said service.

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10. The method as recited in claim 7, wherein said request indicates if messages sent from or received by said message endpoint for said client should be verified for compliance to said schema, and wherein said determining comprises examining said request.

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11. The method as recited in claim 7, wherein said message endpoint is constructed to only verify messages sent from said message endpoint to said service.

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12. The method as recited in claim 7, wherein said message endpoint is constructed to only verify messages received from said service.

13. The method as recited in claim 7, wherein said constructing said message endpoint comprises obtaining an authentication credential for said client to access said service and configuring said message endpoint to include said authentication credential with each message sent to said service address.

14. The method as recited in claim 7, wherein said message schema defines data representation language messages to be sent from said client to said service and from said service to said client.

15. A method for creating a message endpoint on a device in a distributed computing environment, the method comprising:

receiving a request to create a message endpoint for a client on the device to communicate with a service within the distributed computing environment;

obtaining a service advertisement for said service, wherein said service advertisement specifies a message schema defining messages for accessing said service; and

constructing said message endpoint to communicate messages with said service address, wherein said message endpoint comprises computer executable code and wherein at least part of said message endpoint is constructed by using preexisting message endpoint code stored by the device.

16. The method as recited in claim 15, wherein said constructing comprises linking said service address to said preexisting message endpoint code.

17. The method as recited in claim 15, wherein said constructing comprises  
5 obtaining an authentication credential for said client to access said service, and linking  
said authentication credential to said preexisting message endpoint code to include said  
authentication credential with each message sent to said service address.

18. The method as recited in claim 15, wherein said preexisting message  
10 endpoint code comprises message transport code in said device for sending messages.

19. The method as recited in claim 18, further comprising constructing  
additional messages endpoints, wherein each message endpoint is linked to said message  
transport code.

20. The method as recited in claim 18, wherein said message transport code is  
part of the device's system code.

21. The method as recited in claim 15, further comprising maintaining a cache  
20 of message endpoint code, wherein said preexisting message endpoint code comprises  
message endpoint code from said cache.

22. The method as recited in claim 21, wherein said maintaining a cache  
comprises storing message endpoint code for a new message endpoint in said cache when  
25 said new message endpoint is originally constructed.

23. The method as recited in claim 22, wherein said maintaining a cache  
further comprises deleting least recently used message endpoint code from said cache if  
said cache is full when said new message endpoint is originally constructed.

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24. The method as recited in claim 15, wherein said message schema defines data representation language messages to be sent from said client to said service and from said service to said client.

5 25. A device in a distributed computing environment, comprising:

a client configured to request a message endpoint for the client on the device to communicate with a service within the distributed computing environment;

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a message endpoint constructor configured to obtain a service advertisement for said service, wherein said service advertisement specifies a message schema, a service address and an indication of whether or not access to said service is restricted;

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wherein, if access to said service is restricted, said message endpoint constructor is configured to obtain an authentication credential to access said service;

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wherein, if access to said service is restricted and if said authentication credential is obtained, said message endpoint constructor is configured to construct said message endpoint, wherein said message endpoint is configured to send messages according to said message schema to said service address; and

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wherein, if access to said service is not restricted, said message endpoint constructor is configured to construct said message endpoint, wherein said message endpoint is configured to send messages according to said message schema to said service address.

26. The device as recited in claim 25, wherein said constructing is performed within a runtime environment of said device.

27. The device as recited in claim 25, wherein if access to said service is restricted and if said authentication credential is obtained, said message endpoint constructor is configured to construct said message endpoint so that said message endpoint is configured to include said authentication credential with each message sent to said service address.

28. The device as recited in claim 25, wherein if access to said service is restricted, said service advertisements specifies an address for an authentication service; and said message endpoint constructor is configured to request an authentication credential from said authentication service, wherein said authentication credential indicates that said client is authorized to access said service.

29. The device as recited in claim 28, wherein said message endpoint constructor is configured to send an authentication credential request message to said address for said authentication service specified in said service advertisement.

30. The device as recited in claim 25, wherein said message schema defines data representation language messages to be sent from said client to said service and from said service to said client.

31. A device in a distributed computing environment, comprising:  
a client configured to request a message endpoint for the client on the device to communicate with a service within the distributed computing environment;

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a message endpoint constructor configured to obtain a service advertisement for said service, wherein said service advertisement specifies a message schema and a service address for sending messages according to said schema to access said service;

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wherein said message endpoint constructor is configured to determine if messages sent from or received by said message endpoint for said client should be verified for compliance to said schema;

10 wherein, if said messages should be verified, said message endpoint constructor is configured to construct said message endpoint to communicate messages with said service address, and to construct said message endpoint so that said message endpoint is configured to verify messages communicated with said service according to said schema.

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32. The device as recited in claim 31, wherein, if said messages should not be verified, said message endpoint constructor is configured to construct said message endpoint to communicate messages with said service address, wherein said message endpoint is configured to communicate messages with said service without verifying said messages according to said schema.

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33. The device as recited in claim 32, wherein said message endpoint is configured to notify said service that said message endpoint for the client is not performing message verification for messages sent to said service, if said message endpoint is configured to communicate messages with said service without verifying said messages according to said schema.

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34. The device as recited in claim 31, wherein said request is configured to indicate if messages sent from or received by said message endpoint for said client should



be verified for compliance to said schema, and wherein said message endpoint constructor is configured to receive said request.

35. The device as recited in claim 31, wherein said message endpoint is  
5 configured to only verify messages sent from said message endpoint to said service.

36. The device as recited in claim 31, wherein said message endpoint is configured to only verify messages received from said service.

10 37. The device as recited in claim 31, wherein said message endpoint constructor is configured to obtain an authentication credential for said client to access said service and configure said message endpoint to include said authentication credential with each message sent to said service address.

15 38. The device as recited in claim 31, wherein said message schema defines data representation language messages to be sent from said client to said service and from said service to said client.

20 39. A device in a distributed computing environment, comprising:  
  
a client configured to request a message endpoint for a client on the device to communicate with a service within the distributed computing environment;  
  
25 a message endpoint constructor configured to obtain a service advertisement for said service, wherein said service advertisement specifies a message schema defining messages for accessing said service; and

30 wherein said message endpoint constructor is configured to construct said message endpoint to communicate messages with said service address,

wherein said message endpoint comprises computer executable code and wherein at least part of said message endpoint is constructed by using preexisting message endpoint code stored by the device.

5           40.   The device as recited in claim 39, wherein said message endpoint constructor is configured to link said service address to said preexisting message endpoint code.

10           41.   The device as recited in claim 39, wherein said message endpoint constructor is configured to obtain an authentication credential for said client to access said service, and link said authentication credential to said preexisting message endpoint code to include said authentication credential with each message sent to said service address.

15           42.   The device as recited in claim 39, wherein said preexisting message endpoint code comprises message transport code in said device for sending messages.

20           43.   The device as recited in claim 42, wherein said message endpoint constructor is configured to construct additional messages endpoints, wherein each message endpoint is linked to said message transport code.

          44.   The device as recited in claim 42, wherein said message transport code is part of the device's system code.

25           45.   The device as recited in claim 39, wherein the device is configured to maintain a cache of message endpoint code, wherein said preexisting message endpoint code comprises message endpoint code from said cache.

46. The device as recited in claim 45, wherein said device is configured to store message endpoint code for a new message endpoint in said cache when said new message endpoint is originally constructed.

5           47.     The device as recited in claim 46, wherein said device is configured to delete least recently used message endpoint code from said cache if said cache is full when said new message endpoint is originally constructed.

48. The device as recited in claim 39, wherein said message schema defines  
10 data representation language messages to be sent from said client to said service and from  
said service to said client.

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